

The background of the slide is a high-resolution image of the Martian surface, showing dark, layered rock formations and a reddish-brown soil. In the upper left, there is a rectangular inset box. Inside this box, the word "HiRISE" is written in large, bold, orange 3D letters. Below it, the text "High Resolution Imaging Science Experiment" is written in a smaller, orange, sans-serif font. At the bottom of the box, "Mars Reconnaissance Orbiter" is written in a smaller, dark brown, sans-serif font. To the right of the text, there is a 3D rendering of the HiRISE camera instrument, which is a large, cylindrical telescope-like structure with a complex support frame. In the background of the inset, a small image of the Mars Reconnaissance Orbiter satellite is shown in orbit over the Martian surface.

HiRISE

*High Resolution Imaging
Science Experiment*

Mars Reconnaissance Orbiter

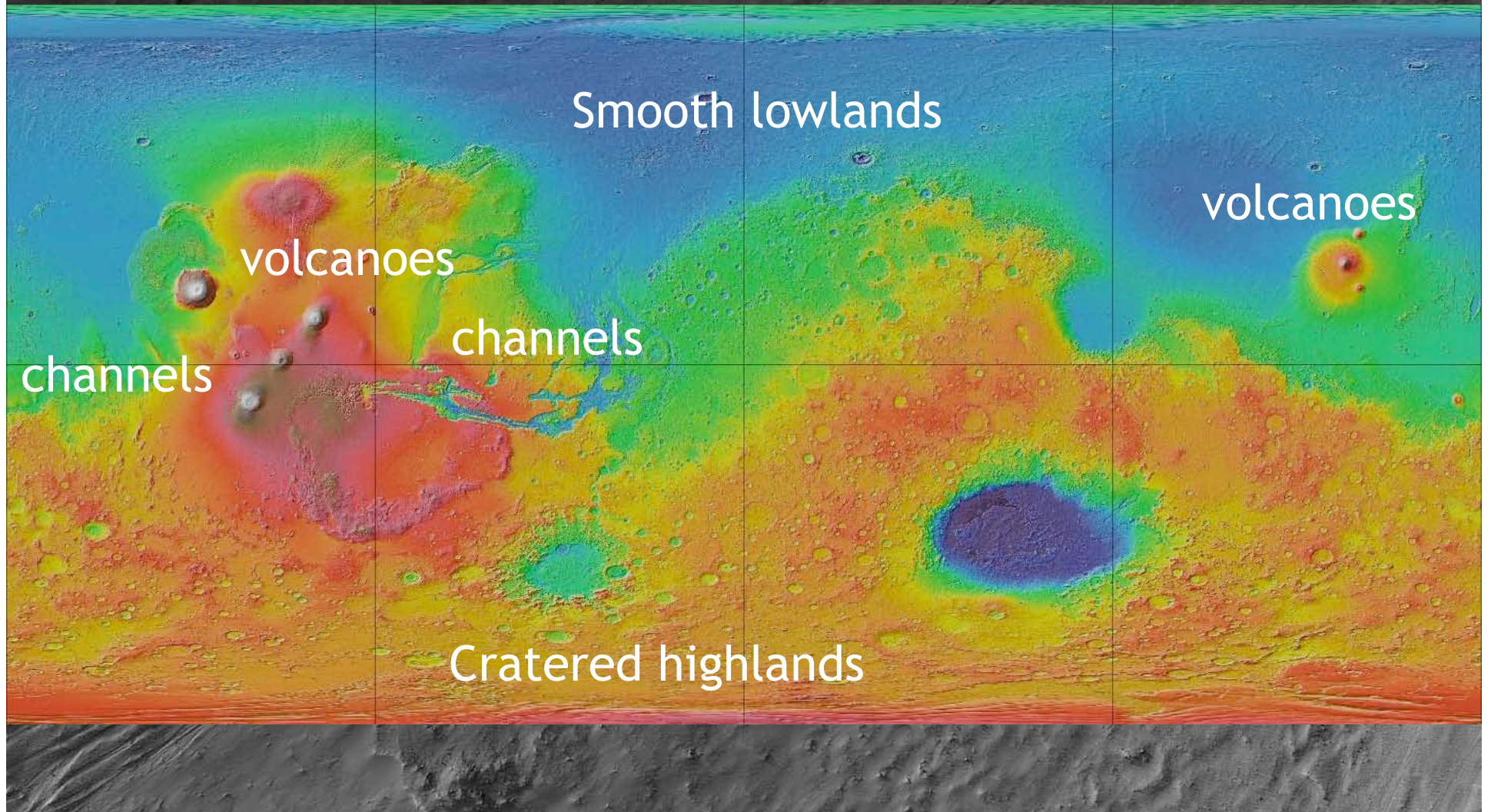
HiRISE Quest Challenge

Welcome!

What are we going to do today?

- Talk briefly about the motivation to study Mars
- Meet the team
- Learn about MRO and HiRISE
- Look at some of the HiRISE Images
- Learn how to get prepared to suggest images
- Learn how to use HiWeb to make suggestions
- Answer any questions

Mars



Water on Mars?

b.y.a.



4.0



3.8



3.5



2.0



1.0



Now

Water on Mars?



The HiRISE Team



MRO: Mars Reconnaissance Orbiter



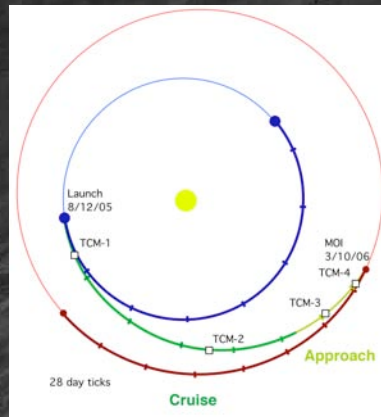
MRO in thermal vacuum chamber

MRO Mission Overview

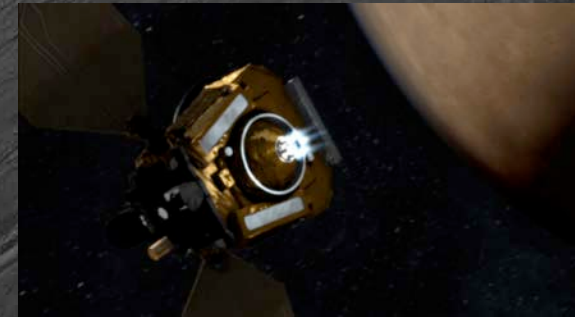
Launch
August 12, 2005



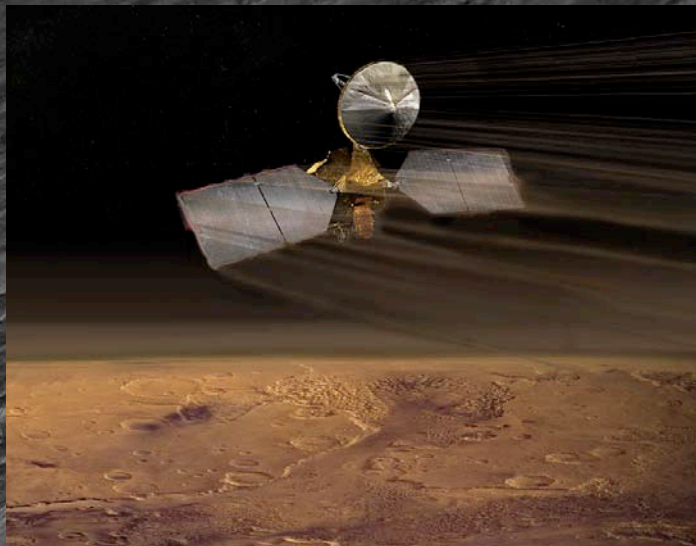
Interplanetary Cruise
August 2005 - March 2006



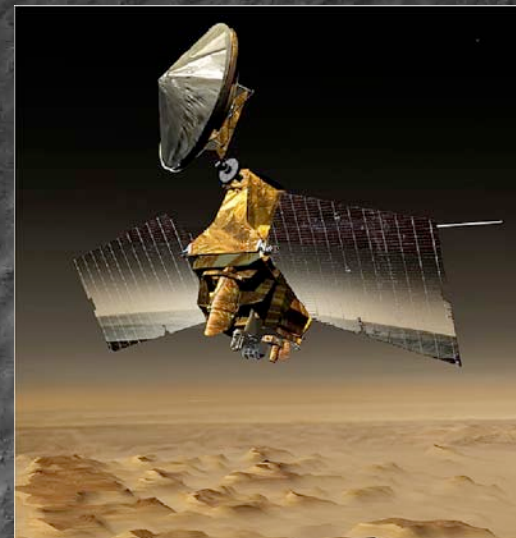
Approach and Orbit Insertion
March 10, 2006



Aerobraking
March - September 2006



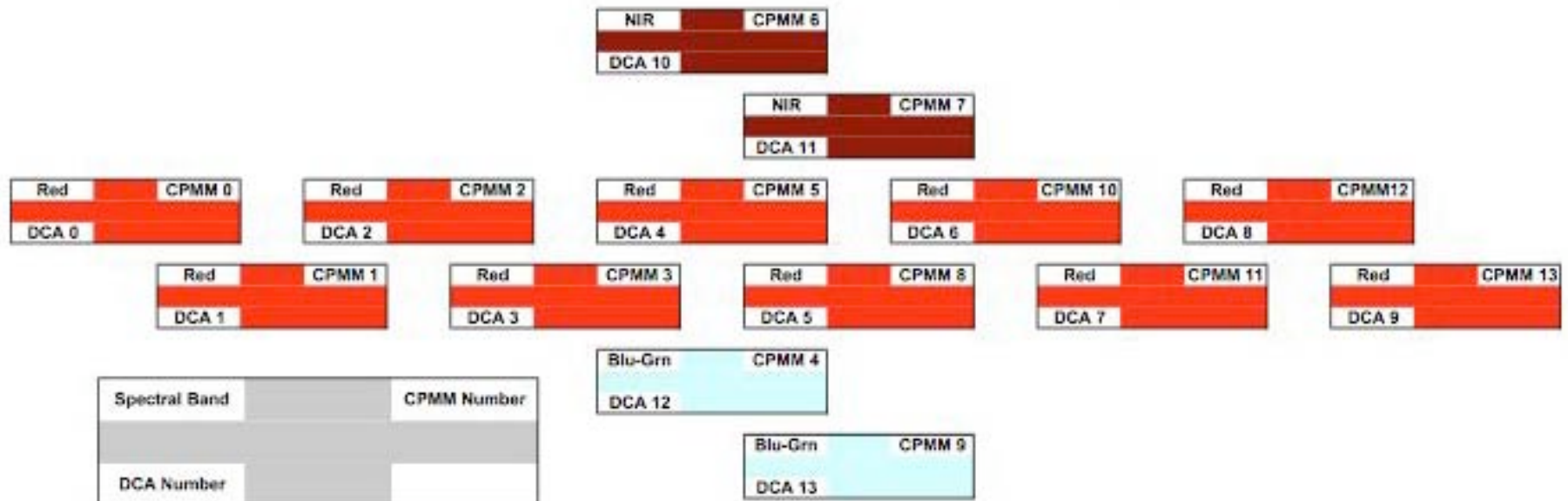
Primary Science Phase
November 7, 2006 - December 2010





HiRISE Flight Structure
(approximately 70 cm in diameter by 1.4 m in length)

HiRISE: High Resolution Imaging Science Experiment



First Steps: Learn about Mars & HiRISE

- <http://marsoweb.nas.nasa.gov/hirise/>

Check out all of the links:

- Image viewer
- HiRISE blog
- Games and activities
- Clickworkers

The website also has more in-depth information on the instrument, current research and more.

HiRISE High Resolution Imaging Science Experiment

Science Goals | Instrument | Team Members | Papers & Talks | Image Viewer | Education | Related Links | Team Resources

New Images for 14 March 2007

- **HiRISE Image Viewer**
Explore images online in full-resolution
- **Image Download Resource Center**
Downloadable images, captions, and special products
- **HiRISE Quest Challenge**
Participate in the HiRISE Image Targeting Challenge
- **HiRISE Operations Center online blog**
HiRISE Team Blog
- **HiRISE Learning and Activities Center**
HiRISE fact sheets, activities, K-14 activity books with teacher guides, detailed science theme descriptions
- **HiRISE Clickworkers**
Volunteer to help identify landforms in HiRISE images

Submit your HiRISE observation suggestion! (Coming Soon)

Mars Reconnaissance Orbiter Mission Status

KEY FEATURES

- Unprecedented image quality, resolution, coverage
- Panchromatic and color images
- Hundreds of full-resolution 20,000 x 40,000 pixel images
- Color images up to 4,072 pixels wide, sub-meter scales
- Thousands of high-resolution sub-scenes with 1 to 2 meters/pixel content
- Hundreds of stereo pairs; production of Digital Elevation Models
- Philosophy: "The People's Camera"

Launched in August of 2005, the High Resolution Imaging Science Experiment (HiRISE) is flying onboard the Mars Reconnaissance Orbiter (MRO) mission. HiRISE will investigate deposits and landforms resulting from geologic and climatic processes and assist in the evaluation of candidate landing sites. By combining very high resolution and signal-to-noise ratio with a large swath width, it is possible to image on a variety of scales down to 1 meter, a scale currently afforded only in glimpses by landers. HiRISE will offer such views over any selected region of Mars, providing a bridge between orbital remote sensing and landed missions. Stereo image pairs will be acquired over the highest-priority locations with a vertical precision of better than 25 cm per pixel. User-friendly web tools will be available to both the science community and the public to view/analyze HiRISE images and to submit observation requests. Processed images will be released soon after acquisition to allow everyone to share in the scientific discovery process.

Partners in Education

- NASA Quest
- MARSQUEST
- The Space Place
- ITEA Technology Teacher
- Smithsonian Institution
- ASU Mars Education Program

SCIENCE GOALS

Understand the geologic and climatic processes and history of Mars, including origins, relative ages, and distributions of:

- Channels and valleys
- Former lakes and oceans
- Recent gullies
- Sedimentary and other layers
- Volcanic landforms
- Glacial and periglacial landforms
- Hydrothermal alteration
- Eolian and polar deposits
- Near-surface crusts and horizons

Channels **Patterned Ground** **Craters** **Lava Flows** **Polar Terrain**

Contacts

NASA Ames Virginia Gulick: HiRISE Public Outreach
Glenn Deardorff: Webwork

Mirror Sites

Primary Site: NASA Ames Research Center
Mirror Site: University of Arizona, Lunar and Planetary Lab

NASA Web Privacy Policy

First Steps: Learn about Mars & HiRISE

- Learning & Activity Center
(<http://hirise.seti.org/hirise>)
 - Read fact sheets, play games, do activities
 - Read about the camera and science themes

HiRISE
High Resolution Imaging
Science Experiment
Mars Reconnaissance Orbiter

HiRISE Learning and Activities Center

[Information Sheets](#) [Tutorials](#) [Science Themes](#) [Curriculum Materials](#) [Games & Puzzles](#) [Links](#)

Soon we will be soliciting suggestions from the public for targets for HiRISE to image. Here you will find a collection of web pages that will help you understand the scientific goals for HiRISE, how the camera operates, and what you need to know in order to suggest a target. We've also developed some educational activity books, games and other activities that we hope will provide a fun way to learn more about Mars and HiRISE.

You will also have the opportunity to help in the analysis and interpretation of HiRISE images. [HiRISE Clickworkers](#) will provide opportunities for the public to build geologic feature databases for the HiRISE team. Through HiRISE Clickworkers, the public will also be able to vote on which HiRISE images become press release images, and to help prioritize HiRISE image suggestions submitted by the general public with time or no science justifications and other unique opportunities. The first phase of [HiRISE Clickworkers](#) is currently in public beta testing. Check it out!

HiRISE Information Sheets: These PDFs give more information about HiRISE. You will need Adobe Acrobat to view these pages. If you do not have Adobe Acrobat Reader, click [here](#) to download this free program.

HiRISE Fact Sheet - this is the official fact sheet of the HiRISE instrument.

Info sheet for Kids - a handout for elementary school aged kids with fun facts about HiRISE and games (2 pages).

Info sheet for Teens - a handout geared towards middle and high school students with more information about HiRISE and games (2 pages).

Bookmarks - bookmarks to print out with images of HiRISE and Mars!

HiRISE Tutorials: These web pages explain the workings of the camera and in the coming months, we plan to open our image suggestion facility, so be sure to check back!

[Lesson One: Camera Basics](#)
[Lesson Two: Resolution and Blurring](#)
[Lesson Three: How to Submit an Image Suggestion tutorial](#)
[Quick Start Tutorial](#)
[Advanced Tutorial](#)
[Ten Steps to Suggesting a HiRISE Image Target](#)

Science Themes: These pages discuss the science themes for our exploration of Mars. When you suggest an imaging target we will ask you to choose a science theme that best describes your goals for the image.

[Climate Change](#)
[Aeolian Processes](#)
[Fluvial and Hydrothermal Processes](#)
[Future Exploration/Landing sites](#)
[Geologic Contexts and Stratigraphy](#)
[Glacial and Periglacial Processes](#)
[Impact Cratering](#)
[Landscape Evolution](#)
[Mass Wasting](#)
[Polar Geology \(detailed version\)](#)
[Seasonal Processes](#)
[Sedimentation/Layering Processes](#)
[Surface Roughness and Rocks](#)
[Surface Composition and Photometry](#)
[Tectonic processes](#)
[Volcanism \(detailed version\)](#)

HiRISE Mars Curriculum Materials: Drafts of our own education resource materials (PDF versions). Student and teacher versions available by clicking on the link to the table of contents. Comments appreciated? [Email us!](#)

[HiRISE Mars Grades K-3 & up Coloring Book](#)
[HiRISE Mars Grades K-3 Activity Book](#)
[HiRISE Mars Grades 4-8 Activity Book](#)
[HiRISE Mars Grades 9-14 Activity Book](#)

First Steps: Learn about Mars & HiRISE

- Clickworkers

(<http://clickworkers.arc.nasa.gov/hirise>)

Mars landform cataloging

http://clickworkers.arc.nasa.gov/landforms?clickworker=23381176366732000&camera=hirise

Mars landform cataloging

HIRISE Clickworkers

Your task: Stamp landform types

Thanks for the 5 images you have examined!

ROCKLIDERS CHANNELS CRATERS DUSTDEVILS WINDSTREAKS DUNES GULLIES

LAVA LAYERS PATTERNED POLES INTERESTING NOOOO

Submit work

This is a tiny piece of one of the images from HiRISE. (If you happen to get an all-black area, it's from the border of a projected image.)

DUNES DUNES DUNES DUNES DUNES DUNES DUNES

If you see dunes on the right, please click in the middle of the the area with dunes. →

You have marked:

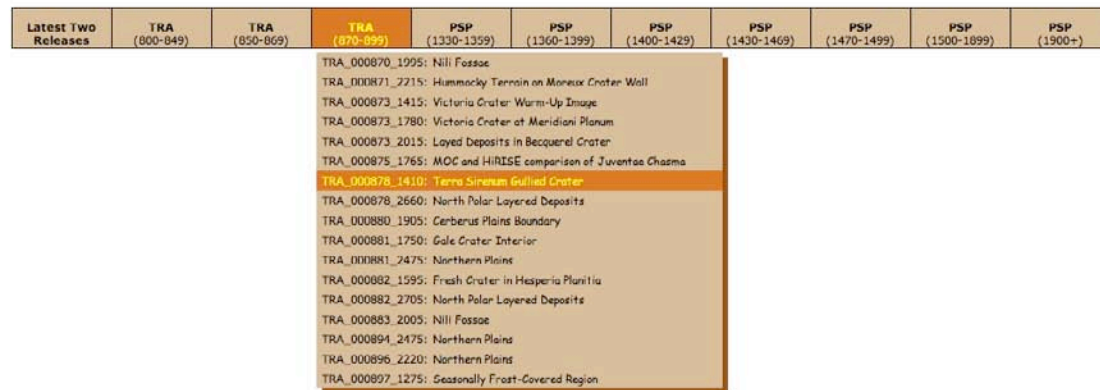
dunes
How sure are you that this is dunes?
maybe ☐ ☐ ☐ ☐ ☐ definitely Delete

dunes
How sure are you that this is dunes?
maybe ☐ ☐ ☐ ☐ ☐ definitely Delete

dunes
How sure are you that this is dunes?
maybe ☐ ☐ ☐ ☐ ☐ definitely Delete

dunes
How sure are you that this is dunes?
maybe ☐ ☐ ☐ ☐ ☐ definitely Delete

- Viewing Images



First Steps: Learn about Mars & HiRISE

- Viewing Images

HiRISE: TRA_000878_1410

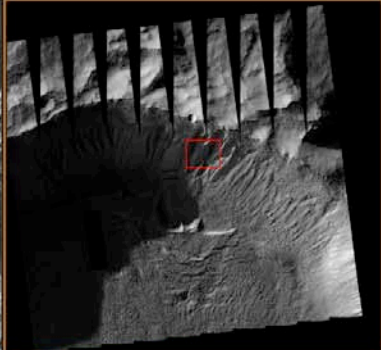
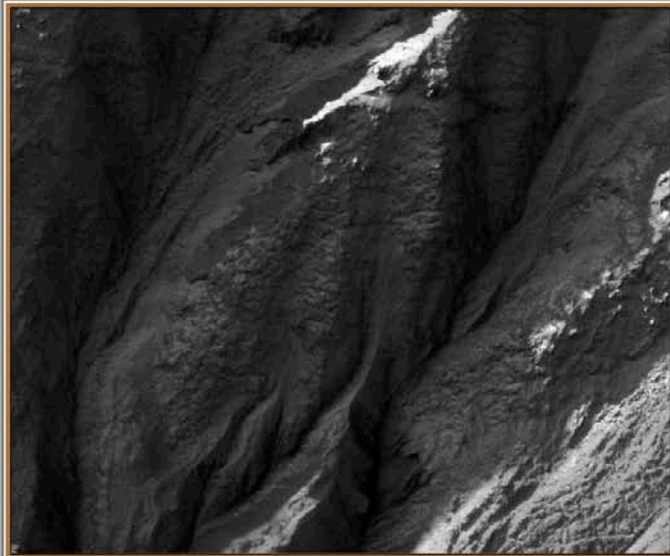
http://marsweb.nasa.gov/HiRISE/hirose_images/TRA/TRA_000878_1410/

Google

HiRISE High Resolution Imaging Science Experiment
First Images From Mars

TRA_000878_1410
Terra Sirenum Gullied Crater

Download Products from the HiRISE Operations Center for TRA_000878_1410
Thumbnail JP2/JPG | Overview JP2/JPG | Full Scale JP2/JPG



Zoom and pan using the toolbar. Click in the map to zoom in, or click and drag in the map to pan. Drag red rectangle in overview to move location.

Zoom PAN RESET

Endobut Map
(approximate location of image)


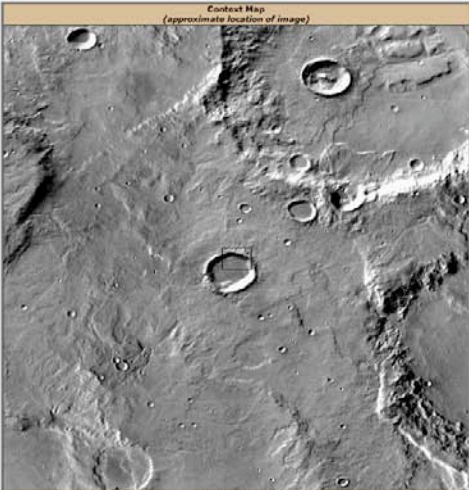
Click to view larger region.

Map Display

Thermal Emission Imaging System
☒ THEMIS
Image Mosaic

Mars Orbiter Laser Altimeter
☒ MOLA
Image Mosaic

Elevation Map



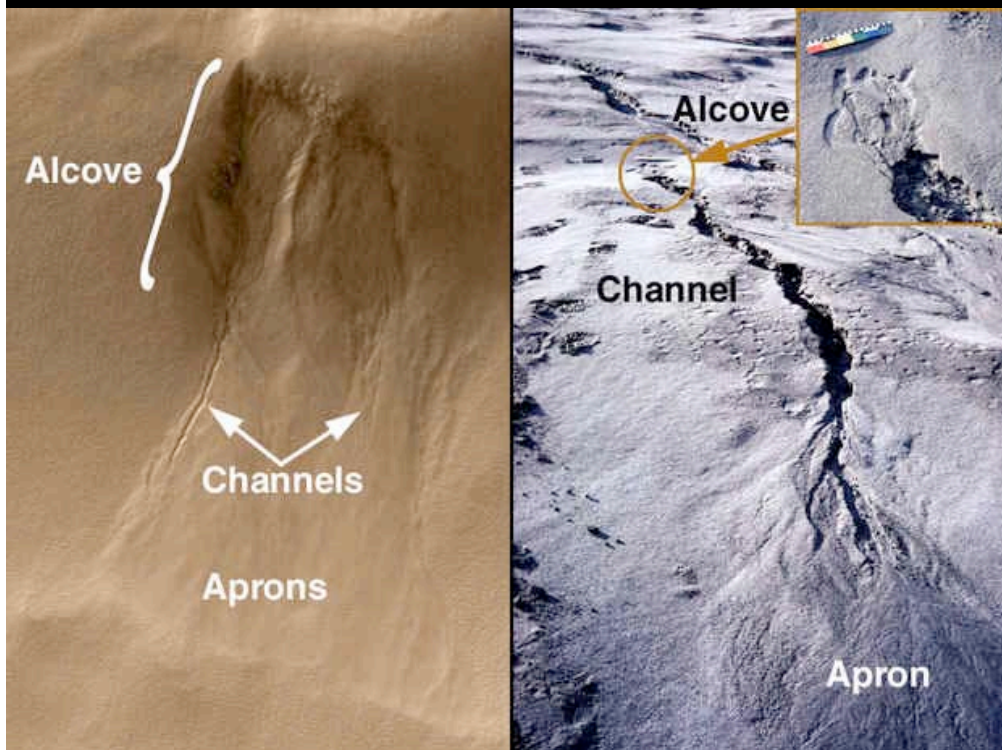
Next: What are some examples of water-related features?

- Gullies
- Valley networks
- Channel systems
- Crater lakes
- Shorelines

Remember scale: You won't be able to see an entire channel system, crater, or valley network. What part of the system do you think is most valuable to see with high resolution imagery to see evidence of past water?

Next: What are some examples of water-related features?

Terra Sirenum Gullied Crater



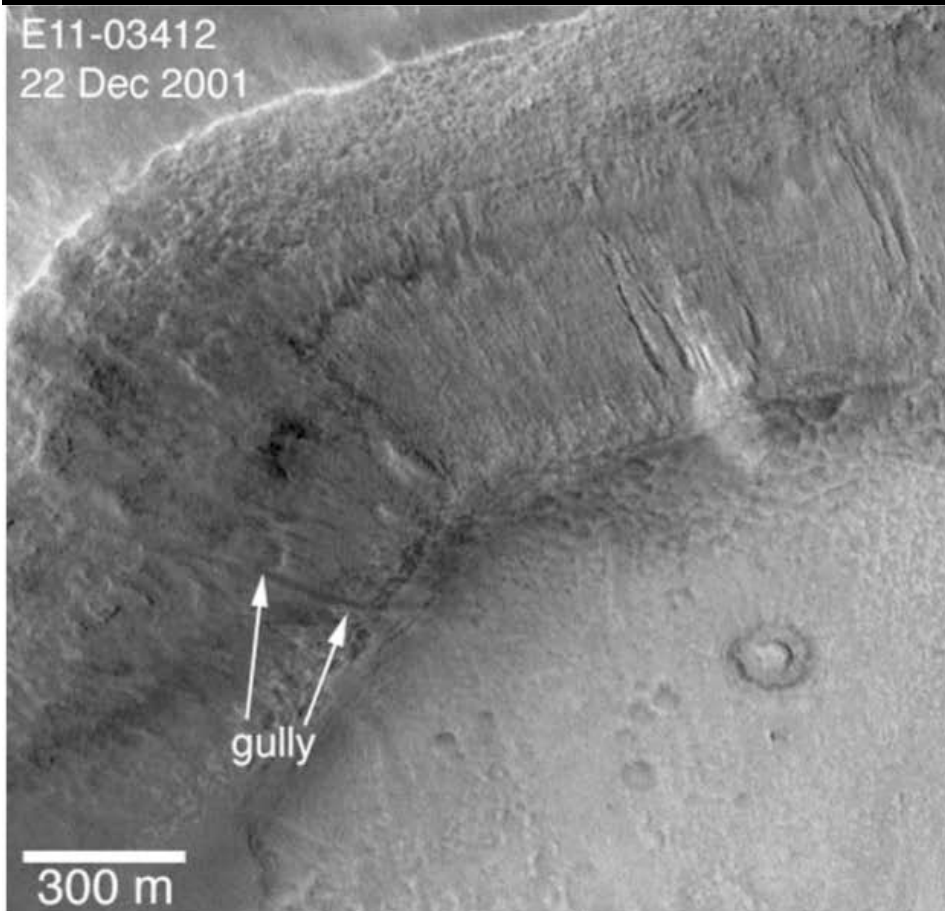
Next: What are some examples of water-related features?



Alluvial Fans in Mojave Crater

Re-image to monitor changes?

E11-03412
22 Dec 2001

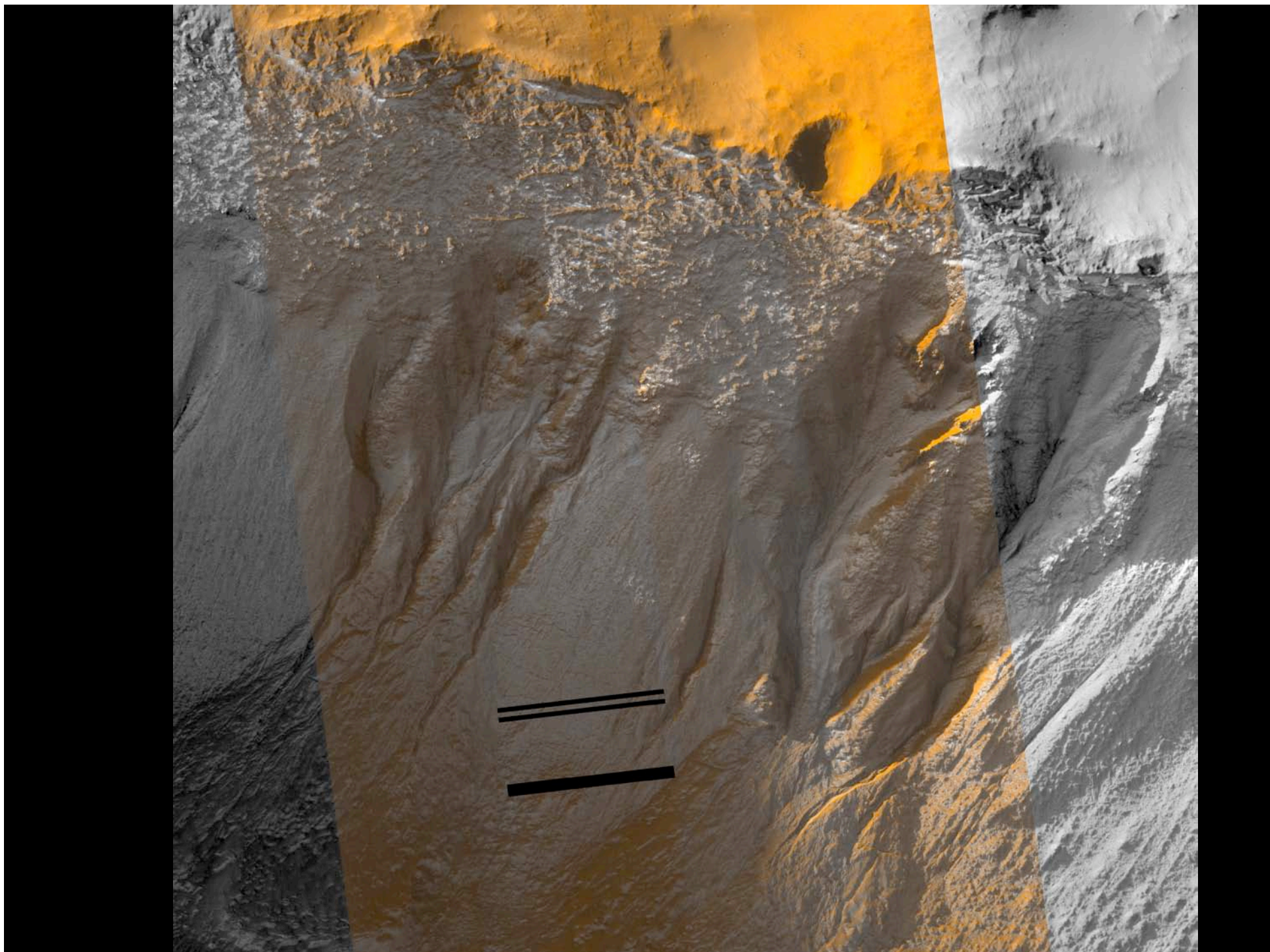


S09-02603; S10-01184
26 Aug; 25 Sept 2005



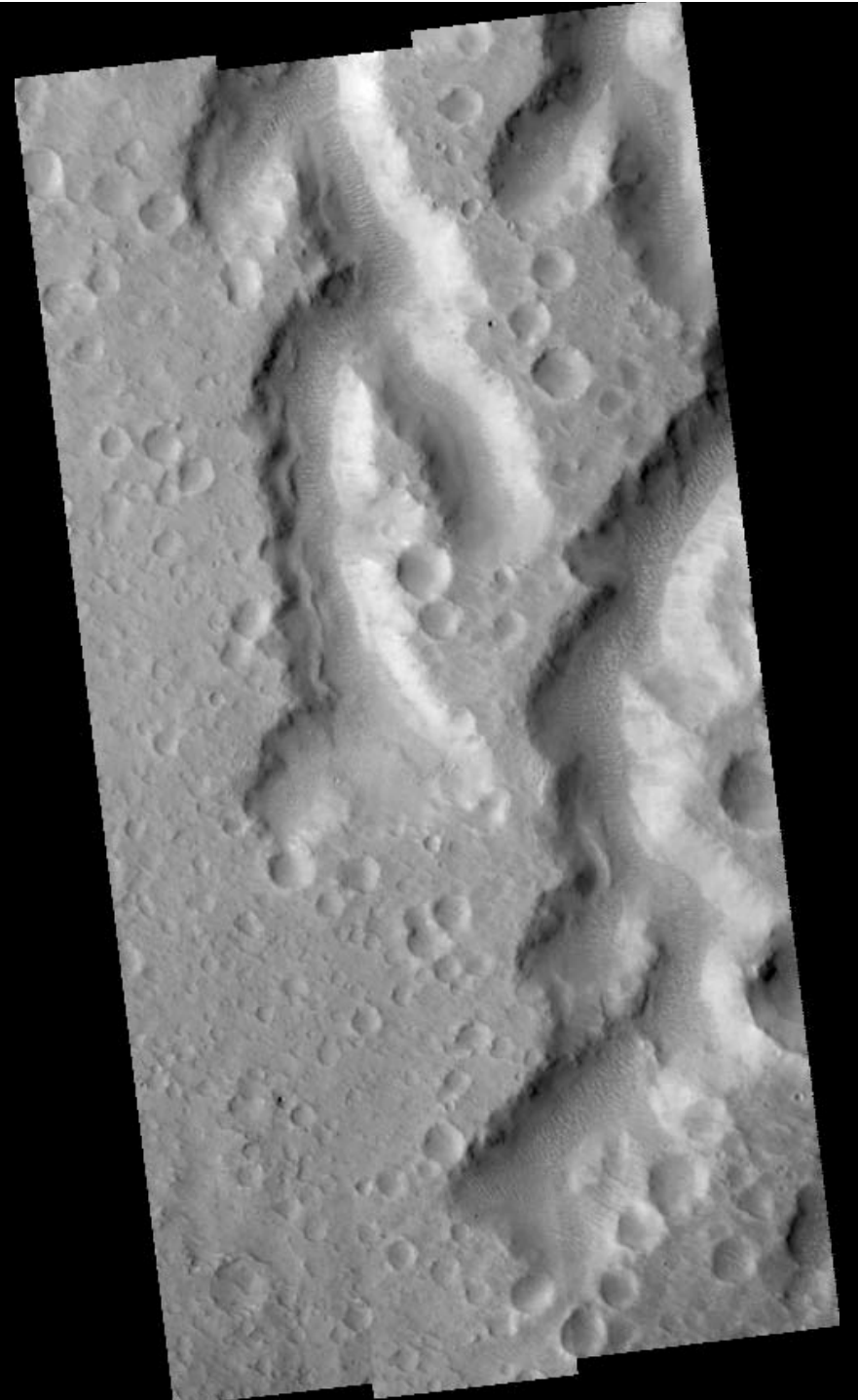
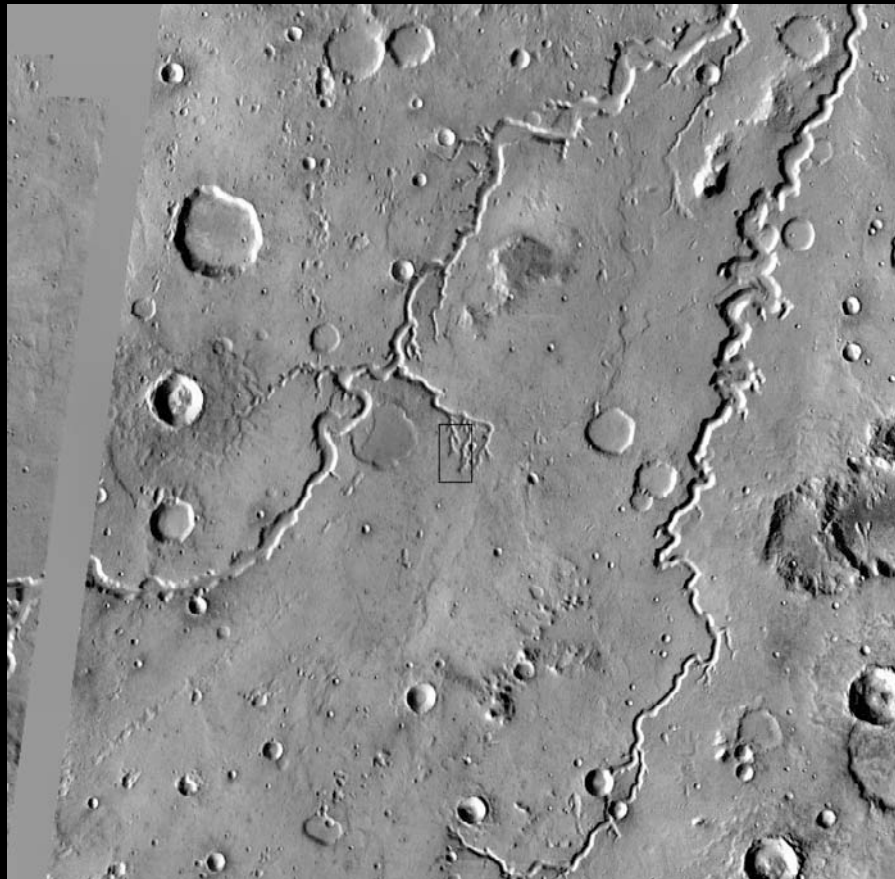
Re-image to monitor changes?



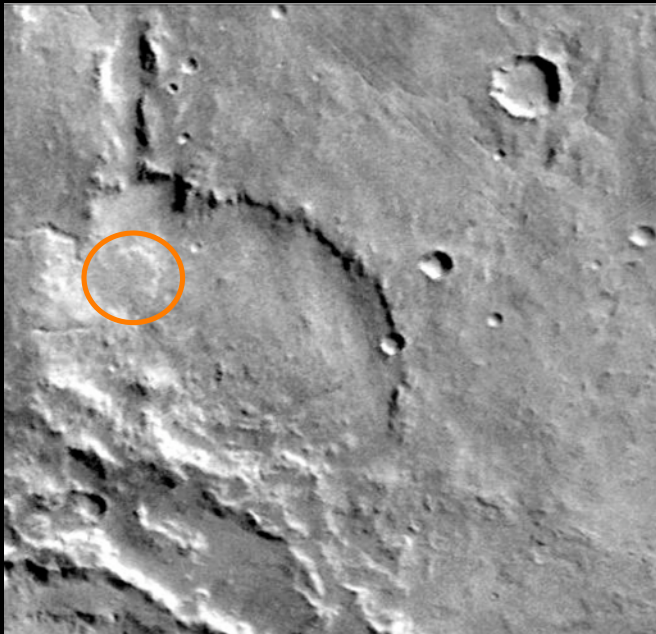


Next: What are some examples of water-related features?

Nanedi Vallis tributaries

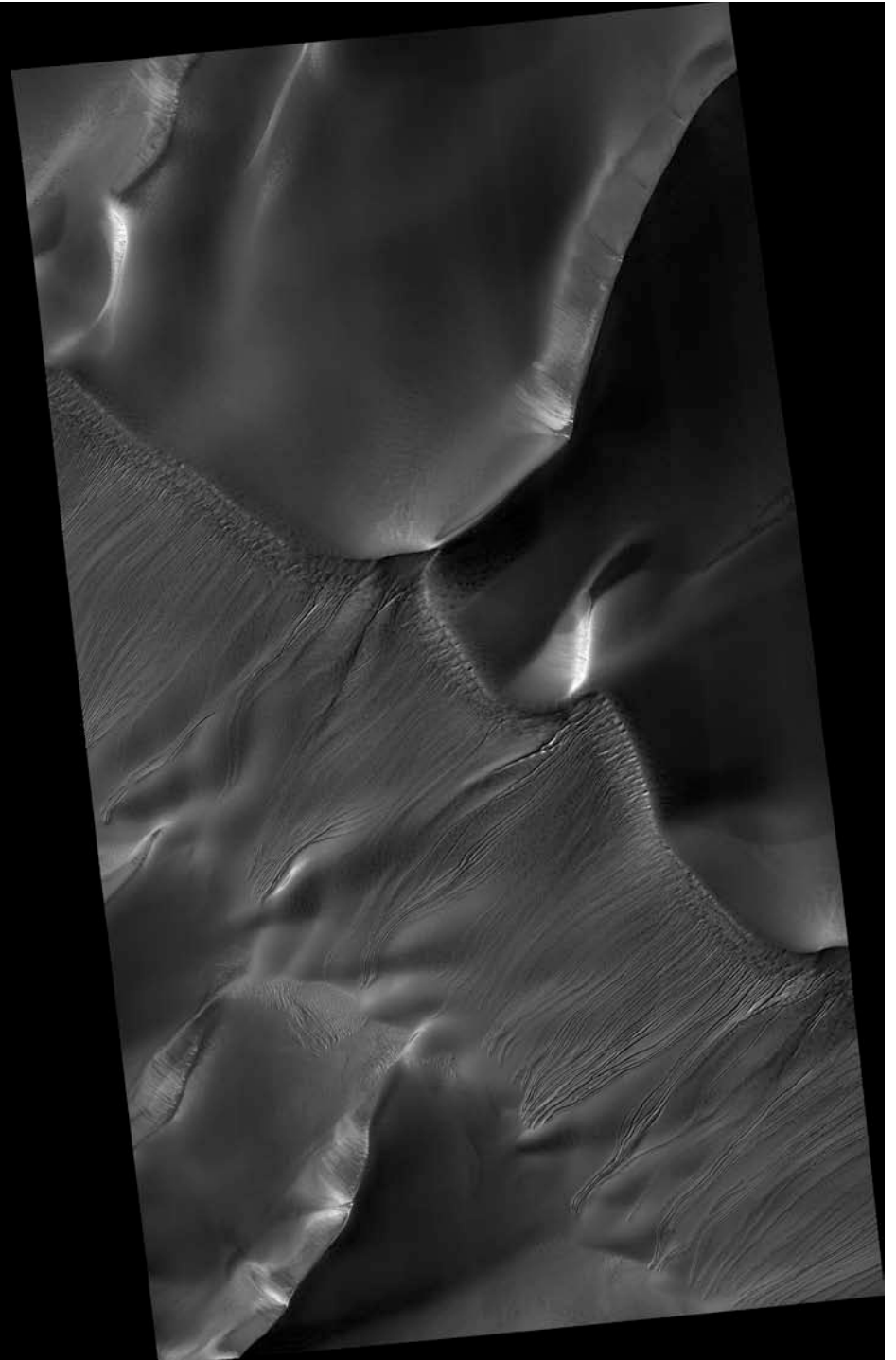


Next: What are some examples of water-related features?



Next: What are
some examples of
water-related
features?

Maybe? Channels on
Dunes in Russell Crater



Finally: Make your target suggestion using HiWeb

- Log in
- Look at Mars using all of the imagery available (Viking, MOC, MOLA, THEMIS, TES)
- Use High-res MOC and Themis images to choose your site
 - Choose an entirely new site
 - Re-image a site in HiRISE (S. mid lat.)
- Register to make your target suggestion

(If you get lost, you can check out the tutorials on the HiRISE Learning Page for help)

Suggesting a HiRISE Image Target

1. Choose a target location
2. Zoom in to target
3. Register/login
4. Select image options
5. Justify target selection
6. Specify season *if needed
7. Submit!

1. Choose a target location

2. Zoom in to target

3. Register/login

4. Select image options

5. Justify target selection

6. Specify season *if needed

7. Submit!